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(54) An electrically driven machine for processing rods, tubes and the like

(57) A machine for processing rods, tubes and the like has an electric motor which is disposed within a housing (12). Located in the housing (12) is a fan (21) which sucks

cooling air into the housing (12) through air intake openings (22). Located in the region of the air intake opening (22) is a cover (29) extending substantially over the cross-section of the air intake opening (22), which cover (29) comprises a passage (35) for the air sucked in. The cooling air passes to the outside through an air outlet opening (28) in the housing (12) which is covered by a filter (45). The cover (29) forms protection against contact and prevents the admission of water and granular foreign bodies into the housing (12). The filter (45) at the air outlet opening (28) likewise prevents the penetration of foreign bodies. The cover (29) also reduces the noise level of the motor.

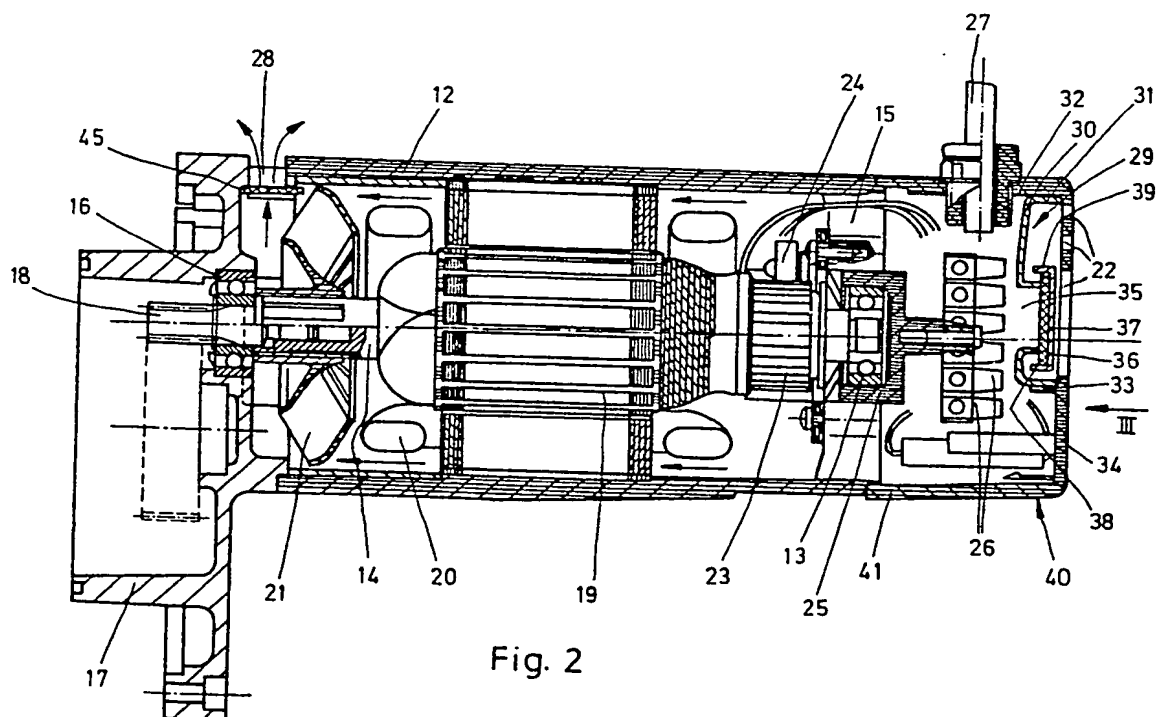
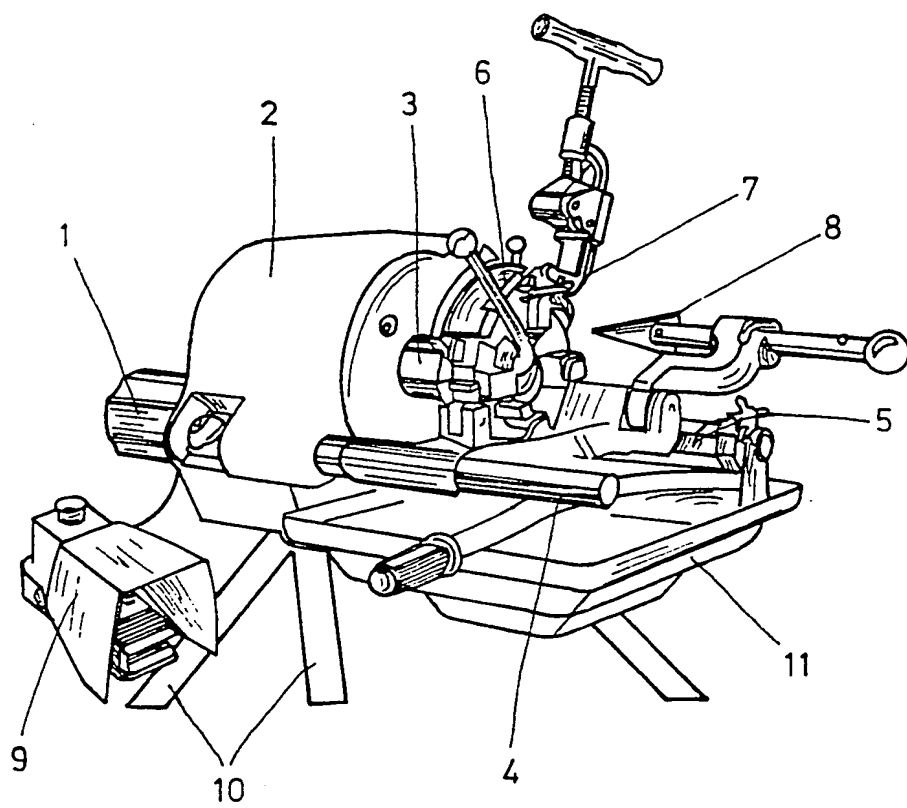


Fig. 2

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Fig. 1



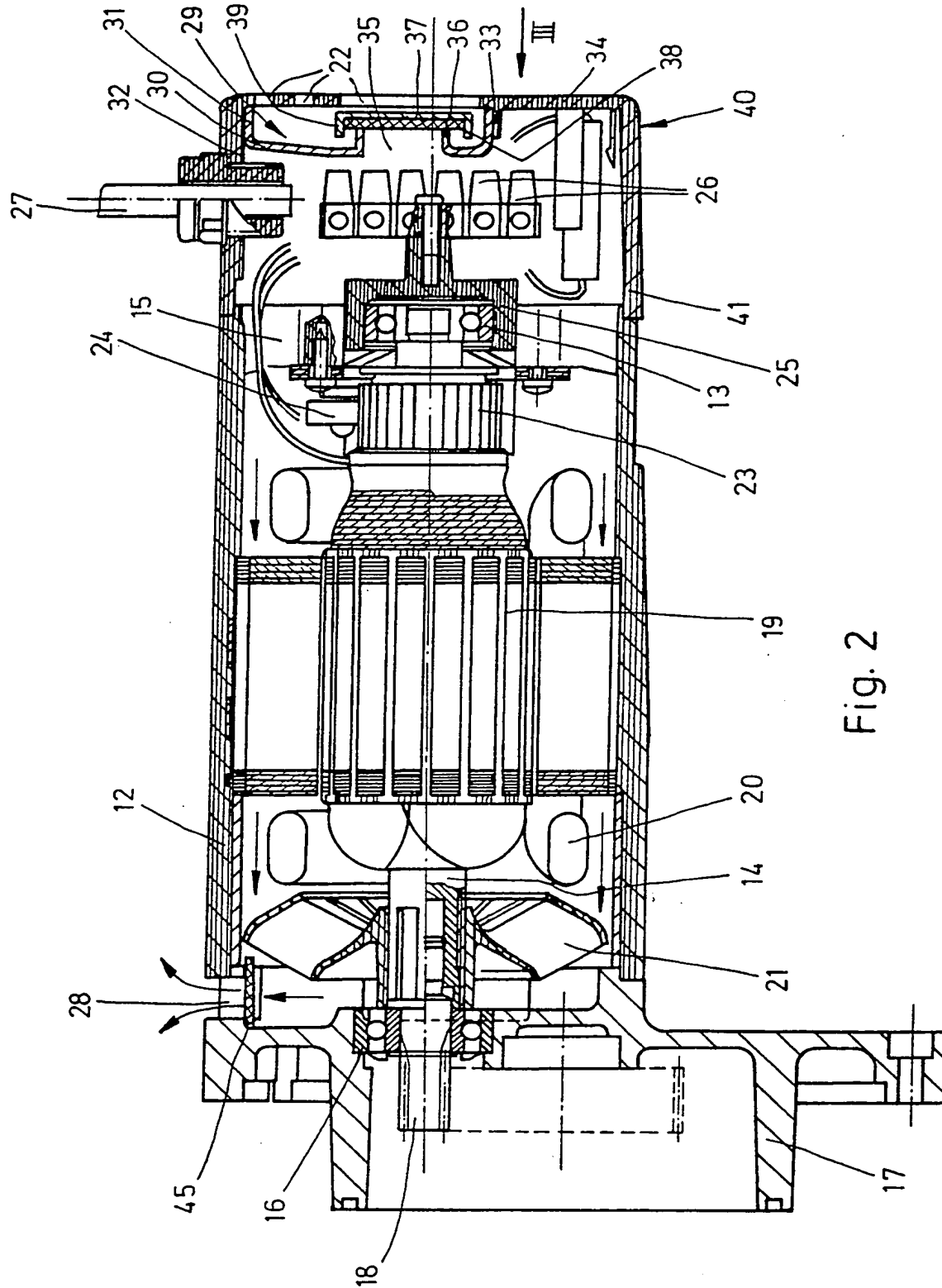


Fig. 2

Fig. 3

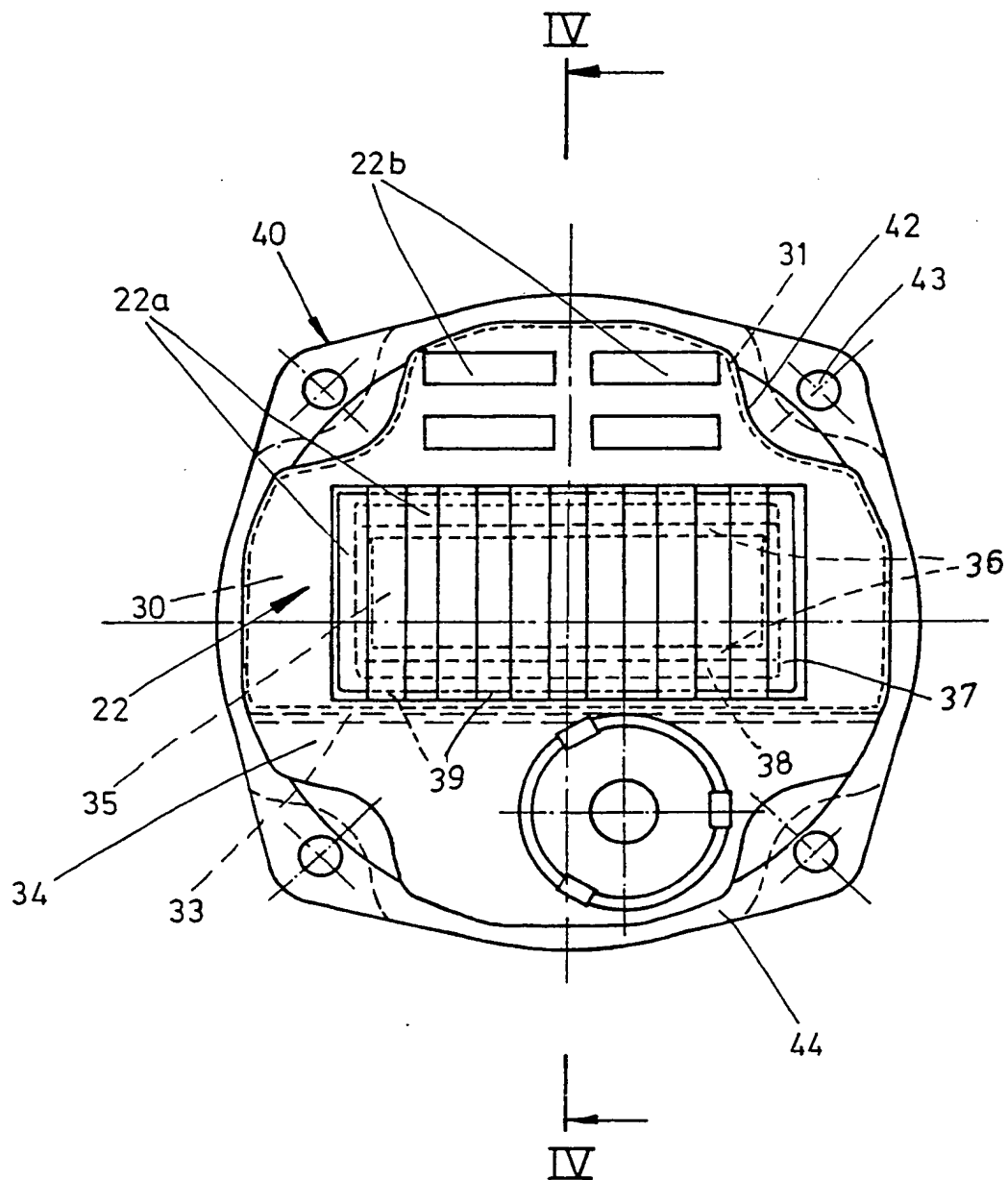


Fig. 4

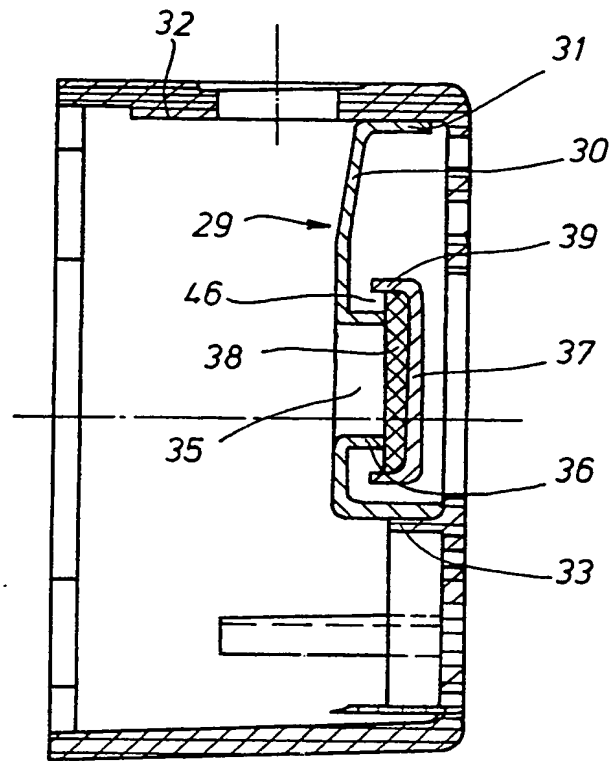
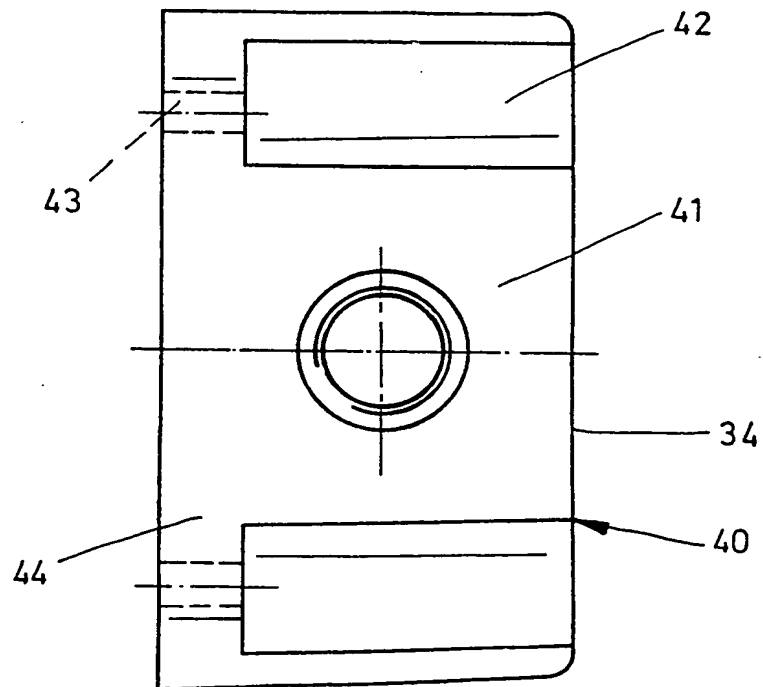


Fig. 5



SPECIFICATION

An electrically driven machine for processing rods tubes and the like

- 5 This invention relates to a machine for processing rods, tubes and the like, such as a thread-cutting machine, a tube-scraping machine or the like.
- 10 For the drive of thread-cutting machines, universal motors are frequently used as the electric motors, since they have a relatively low weight, so that the thread-cutting machine can be easily transported. The air intake
- 15 opening on the housing of the electric motor is so constructed as to allow the live or moving parts located in the housing to be contacted with tools, wires or the like. Also spray water may pass relatively easily into the
- 20 inside of the housing through the air intake opening. Finally, even smaller foreign bodies may also enter the inside of the housing through the air intake opening and the air outlet opening. There is thus a danger that
- 25 not only is the operator injured for example if he accidentally touches parts which are live, but that also the electric motor itself is damaged due to the penetration of foreign bodies or spray water. Furthermore, on account of
- 30 their high operating speeds, which lie in the range of between 20,000 and 25,000 rpm for example, these universal motors reach noise levels which exceed the admissible levels.
- 35 The object of the invention is to construct the aforementioned type of machine so that parts which are located in the housing, which are live or moving, cannot be touched accidentally and foreign bodies or spray water
- 40 cannot penetrate through the air intake opening and air outlet opening, but nevertheless that these openings ensure an adequate intake of cooling air.
- The invention provides a machine for processing rods, tubes and the like, having an
- 45 electric motor, disposed within a housing which is provided with at least one air intake opening and at least one air outlet opening, and having a fan which is secured on a drive shaft of the motor, the shaft being supported
- 50 by bearings to rotate inside the housing, characterised in that provided in the region of the or each air intake opening is a cover extending substantially over the cross-section of the
- 55 air intake opening, which cover comprises at least one passage for the air sucked in, and that the or each air outlet opening has a filter extending thereacross.
- The cover present in the region of the air
- 60 intake opening provides protection against contact, since it prevents direct access to the live or moving parts inside the housing. The passage for the air sucked in is naturally designed so that despite the protection
- 65 against contact, an adequate quantity of cooling air can be sucked in by the fan of the electric motor. However, the cover serves not only as protection against contact, but also prevents the entrance of water and granular
- 70 foreign bodies. The filter at the air outlet opening likewise prevents the penetration of such foreign bodies, but ensures that the cooling air sucked in by the fan by way of air intake opening may flow in a trouble-free
- 75 manner through the air outlet opening. As a result of the construction according to the invention, an electric motor is provided which is not only of light weight, but in addition provides optimum protection against damage
- 80 to the motor or injury to the operator. Furthermore, the cover considerably reduces the development of noise in a surprising manner so that the electric motor also satisfies the increased noise protection levels. Thus, only a
- 85 single component is necessary for sound insulation protection against contact, protection against spray water and against the penetration of foreign bodies.
- Further features of the invention will become apparent from the following claims, description and drawings.
- The invention is described in detail with reference to one embodiment illustrated in the drawings, in which:—
- 95 *Figure 1* is a perspective illustration of a thread-cutting machine equipped with an electric motor,
- Figure 2* is an axial section through the electric motor,
- 100 *Figure 3* is a plan view of the electric motor in the direction of arrow III of Fig. 2,
- Figure 4* is a section on line IV—IV of Fig. 3,
- Figure 5* is a side view of a cover for the electric motor.
- 105 The machine illustrated in the drawings is a thread-cutting machine, but could be a tube-scraping machine or other machine for processing rods, tubes and the like. It has an electric motor 1, preferably a universal motor,
- 110 located in a housing 2, by means of which a grip 3 can be set in rotation. The workpiece to be machined is clamped by clamping jaws (not shown) of the grip 3 and is rotated about its axis by way of the electric motor 1. On the
- 115 side of the housing 2 remote from the electric motor 1, a cutting head 6, a tube cutter 7 and a tool 8 for internal deburring of a tube are attached one behind the other on two guide bars 4, 5. The electric motor 1 can be started and stopped by way of a foot switch
- 120 9. The thread-cutting machine is supported on legs 10 on the ground and in the region below the machining tools 6 to 8 comprises a collecting trough 11.
- 125 The electric motor 1 has a housing 12 (Fig. 2), which preferably consists of synthetic material. At one end, a bearing 13 for one end of a drive shaft 14 is located, which end is supported on the inner wall of the housing 1
- 130 by transverse struts 15. The other end of the

drive shaft 14 is mounted to rotate in a further bearing 16, which is located in a connecting part 17 of the housing. An input shaft of the grip 3 can be connected to the free end 18 of the drive shaft 14. In the region between the two bearings 13, 16, the drive shaft 14 supports a rotor winding 19, which is surrounded with a slight gap by a stator winding 20, which is attached to the inner wall of the housing 1. Secured on the drive shaft 14, in the region between the rotor winding 19 and the bearing 16, is a fan 21, by means of which cooling air for cooling the motor can be sucked into the inside of the housing 12 through air intake openings 22.

Seated on the drive shaft 14 in the region between the bearing 13 and the rotor winding 19 is a commutator 23, against which carbon brushes 24 bear, which are retained on the transverse struts 15 of the bearing 13. A bearing body 25 enclosing the bearing 13 supports electrical connections 26 for an electrical supply lead 27.

The drive shaft is driven in known manner, due to which it sets the grip 3 in rotation by way of its end 18 connected to the input shaft of the grip 3. The fan 21 is in this case likewise driven and sucks cooling air through the air intake openings 22 into the housing 12. Inside the housing the cooling air flows in the direction of the arrows shown and escapes through an air outlet opening 28 in the vicinity of the bearing 16. The cooling air flows around the stator and rotor windings and cools the latter, so that excessive heating of the motor is prevented.

The air intake openings 22 are covered by a cover 29. The cover has a dish-shaped retaining part 30, which bears by a peripheral edge 31 bent upwards, against the inner wall 32 of the housing and against the inner wall 32 of the housing and against a cross-piece 33, which projects at right angles inwards from a covering wall 34 of the housing 12 and extends in a straight line between opposite sides of the covering wall (Fig. 3). The outer contour of the retaining part 30 is adapted to the shape produced by the cross-piece 33 and the adjoining sections of the inner wall 32 of the housing 12, so that the retaining part 30 bears over its entire periphery, over its complete surface with the edge 31 bent upwards against the cross-piece 33 and the corresponding inner wall sections. The air intake openings 22 are formed by elongated openings 22a and 22b arranged approximately centrally in the cover wall 34. The openings 22a have a rectangular contour and like parallel with each other. The openings 22b likewise have a rectangular contour but are slightly shorter than, and lie at right angles to, the openings 22a. Furthermore, the openings 22a are arranged side by side in one row, whereas the openings 22b are arranged in two rows (Fig. 3).

The retaining part 30 has a central passage 35, which has a rectangular contour and is defined by an edge 36 of the upwardly directed retaining part 30. The passage 35 is located approximately halfway along the length of the air intake openings 22a and its width corresponds to approximately half the length of these openings. It is located in the region below these openings 22a (Fig. 3) and extends as far as the two terminal openings 22a. The cooling air sucked in through the air intake openings 22 is able to flow through the passage 35 in a sufficient quantity into the inside of the housing 12, despite the cover 29.

The passage 35 is covered by a covering part 37, which bears against the edge 36, 36a of the retaining part 30. The covering part 37 has a rectangular contour and its width is greater than the width of the passage 35 (Fig. 2). Furthermore, the covering part 37 bears against the end face of the edge 36 with the interposition of a filler 38. The covering part 37 has a U-shaped cross-section. Its longitudinal edges 39 are bent over in the direction of the retaining part 30 and are at a distance from the edge 36. The edges 39a of the covering part 37 located on the narrow sides (Fig. 3) are engaged on the edges 36a of the passage 35. Thus, the covering part 37 is mounted in a fixed, but detachable manner on the edge of the passage. Furthermore, the covering part 37 is constructed in the form of a plate.

The filter 38 is constructed so that it allows the cooling air sucked in to pass unimpeded into the inside of the housing. Since the edge 36 and the edge 39 are at a distance apart and furthermore these edges, seen in axial section according to Fig. 2, are arranged to overlap each other, an opening 46 is formed in the manner of a labyrinth gland, through which any admission of water, which may arrive in the inside of the housing through the air intake openings 22, is reliably prevented.

The cover 29 prevents tools, wires or the like, which are pushed through the air intake openings 22, from being able to come into contact with the live or rotating parts inside the housing. Nevertheless, as a result of the passage 35 and the labyrinth-like arrangement between the retaining part 30 and the covering part 37, unimpeded admission of cooling air sucked in by the fan wheel 21 into the inside of the housing is ensured.

In place of the filter 38, the covering part 37 comprise rib-like webs, projections and the like arranged at a distance apart on its lower side, in the region between its bent edges, with which, when placing the covering part on the end face of the edge 36 of the retaining part 30, an adequate gap between the edge 36 and the covering part is formed for the passage of the cooling air. The use of the filter 38 has the advantage that even granular

foreign bodies and the like cannot enter the inside of the housing, but are retained on the filter 38.

The cover 29 is advantageously located
5 inside the housing, so that it cannot be damaged accidentally. The cover may be constructed as a supplementary part, which can be subsequently inserted in the inside of the housing. Due to this, even existing electric
10 motors can be provided with this cover. The cover 29 preferably consists of insulating material, so that even in the region of the cover, adequate protective insulation is provided. It is finally also possible to construct the cover
15 29 without using the filter 38 so that solid foreign bodies cannot penetrate the inside of the housing. In this case it is quite possible to arrange with this construction that even without a filter, foreign bodies with a diameter of
20 greater than 1 mm cannot penetrate the passage 35.

The cover 29 can be constructed so that it is placed on the cover wall 34 of the housing
12 or that it surrounds the housing 12 in the manner of a hood or completely. Also, due to
25 this, a high protection against the penetration of foreign bodies, in particular of foreign bodies with a diameter of greater than 1 mm and of spray water is ensured. Furthermore,
30 the cover likewise prevents accidental contact with live and rotating parts located inside the housing.

Advantageously, the cover wall 34 is part of a hood 40, which is detachably connected to
35 the remaining part of the housing. Consequently the cover 29 can be mounted very simply and can be exchanged without difficulty, if necessary. As shown in Fig. 3, the side wall 41 of the hood 40 comprises recesses 42, in order to facilitate the fitting of
40 screws (not shown), which are inserted through openings 43 in a flange 44 and are screwed into tapped holes located on the end face of the remaining part of the housing.

In order to prevent the penetration of
45 foreign bodies, preferably of foreign bodies with a diameter of greater than 1 mm through the air outlet opening 28, the latter is covered by a dust filter 45, which allows an unimpeded passage of air and retains foreign
50 bodies. Advantageously, the dust filter 45 consists of a fine-mesh metal gauze, which is located inside the housing 12 in front of the air outlet opening 28. For example, the dust
55 filter may be stuck on, screwed on or attached in a similar manner. Naturally, it may also be provided on the outside of the housing 12. The air outlet opening 28 itself can also be constructed in the manner of a filter, so that
60 an additional filter can be dispensed with.

CLAIMS

1. A machine for processing rods, tubes
and the like, having an electric motor dis-
65 posed within a housing which is provided with

at least one air intake opening and at least one air outlet opening, and having a fan which is secured on a drive shaft of the motor, the shaft being supported by bearings
70 to rotate inside the housing, characterised in that provided in the region of the or each air intake opening is a cover extending substantially over the cross-section of the air intake opening, which cover comprises at least one
75 passage for the air sucked in, and that the or each air outlet opening has a filter extending thereacross.

2. A machine according to claim 1, characterised in that the or each passage is covered with respect to the or the respective air intake opening.

3. A machine according to claim 1 or 2, characterised in that the or each cover is located inside the housing.

4. A machine according to any one of claims 1 to 3, characterised in that the or each cover for the passage of air is provided with a labyrinth-like opening.

5. A machine according to any one of claims 1 to 4, characterised in that the or each cover is detachable.

6. A machine according to any one of claims 1 to 5, characterised in that the or each cover comprises a retaining part and a
95 cover part which is detachably connected to the retaining part.

7. A machine according to claim 6, characterised in that the retaining part has a
100 section against an inner wall of the housing.

8. A machine according to claim 6 or claim 7, characterised in that the retaining part comprises the passage.

9. A machine according to any one of claims 1 to 8, characterised in that the passage has a rectangular contour.

10. A machine according to claim 8, characterised in that the passage is formed by a cut-out in the retaining part and is defined by
110 a bent edge of the retaining part.

11. A machine according to claim 10, characterised in that the cover part rests on the bent edge of the retaining part leaving at least one opening free.

12. A machine according to claim 10 or claim 11, characterised in that the cover part has bent edges located spaced from the bent edge of the retaining part.

13. A machine according to claim 12, characterised in that seen in axial section through the motor, the bent edges of the cover part overlap the bent edge of the retaining part.

14. A machine according to any one of claims 10 to 13, characterised in that the cover part rests on the bent edge of the retaining part with the interposition of a filter.

15. A machine according to any one of claims 1 to 14, characterised in that the filter
130 of the air outlet opening is a fine-mesh metal

gauze.

16. A machine according to any one of claims 1 to 15, characterised in that the cover comprises insulating synthetic material.

- 5 17. A machine substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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